ESTO

Earth Science Technology Office

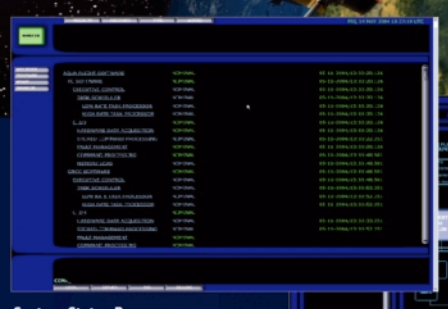
AQUA MODEL-BASED ADVISOR

As part of NASA's Earth Observing System, the AQUA satellite plays a vital role in the study of the interrelated processes of atmosphere, land, and water as well as their relationship to the Earth system. The Aqua Model-Based Advisor helps safeguard this asset by constantly monitoring AQUA's flight software and alerting mission operators of errors.

How it Works

A key feature in the design of AQUA's command and data handling sub-system is a distributed processor/controller arrangement consisting of four asynchronous central processing units (CPUs) dedicated to satellite power, guidance/control, instruments, and commanding. Because of the importance of the CPUs to overall mission success, the Aqua project decided to use a model-based monitoring system in an off-line configuration to observe and evaluate the telemetry received from them.

Every six hours telemetry data from AQUA's solid-state recorder is downlinked and automatically delivered to the Model-Based Advisor. The models in the advisor transform individual telemetry points into information about how well AQUA's CPUs and flight software are functioning, logs transitions into and out of error conditions and enables engineers to analyze this information from anywhere that has connectivity to the Internet.

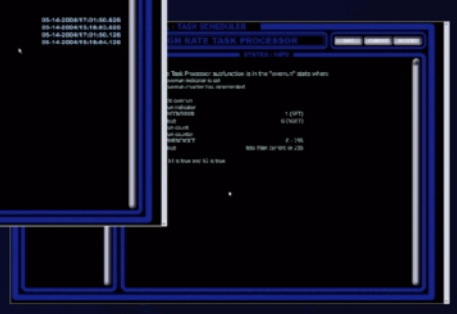


System Status Browser

Data-Driven Active Schematic

Searchable Archive Map

Current Subsystem Display



Model Element Details

Features and Benefits

- Provides near real-time alerts to mission operators via email or email-enabled pagers
- Detects error conditions that may only last several seconds
- Supplies analysts with information, instead of obscure data sets
- Captures state information in a searchable, and retroactively modifiable, archive
- Allows for additions and modifications due to open standard construction

Future Applications

- May also be used to support the AURA satellite and other present and future missions
- Technology can be modified for use in almost any remote system where complexity requires advanced monitoring tools

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